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construction, road kill, habitat fragmentation, alteration of movement and behavior, spread of exotic species, spread of human activity, reduction of environmental quality, and facilitation of urban sprawl. All of these are major impacts to wildlife that must be discussed in an improved DEIS/EIR.

1. The DEIR/EIS fails to analyze the environmental advantages of Rail Corridors over Highways

The DEIS/R must explicitly list and discuss the following advantages of railway corridors over highways (from DeSanto and Smith 1993):

1. Water drains away from the railbed, maintaining a dry environment that prevents unwanted vegetation from establishing.
2. The bed and banks have a porous, stable ballast that prevents runoff from concentrating, keeps slope erosion to a minimum, and filters out particulates and chemical pollutants.
3. A service road or other narrow strip running alongside the rail prevents ballast spoils from shifting beyond the toe of the roadway slope.
4. Drainage ditches parallel to the rail prevent uncontrolled erosion, act as sediment traps, filter railway runoff, and insulate adjoining land from uncontrolled channel flow.
5. High Speed Rail (HSR) construction usually leaves a significantly smaller footprint than road construction, so it has smaller short-term impacts.
6. HSR corridors are narrower than roads, so animals are more willing to cross under them. This is a significant advantage.
7. It is more feasible to elevate an HSR system on pile-supported structures than to elevate a road. "Elevated corridors on bridges or viaducts undoubtedly have the least disruptive impact on wildlife movement and migration passageways."

The DEIR/EIS fails to include any discussion of these issues.

2. The DEIR/EIS fails to adequate analyze the impacts of habitat fragmentation

Expanding networks of roads force wildlife to live on ever-shrinking islands of habitat, where it is more difficult for them to find food, water, shelter, mates, and protection from predators. Genetic problems such as inbreeding appear, and populations become more susceptible to catastrophic events such as wildfire. The resulting fragmented habitat inevitably leads to smaller populations of wildlife, and extinction of populations or species becomes more likely.

Fragmentation also increases the ratio of edge habitat to interior habitat, which is harmful to those species that need interior habitat. The concept has been best documented in forest-dwelling birds. The inside of a habitat has a different climate and supports different and usually more sensitive species than do the edges. In forested areas, edges associated with roads are a source of nest predators and brood parasites. Aggressive species such as brown-headed cowbirds and blue jays thrive in edge habitats (e.g. Baker and Lacki 1997). Snakes, raccoons, and other predators hunt along the edge. Species that occur only within the interior of forests, such as the ovenbird, scarlet tanager, hooded warbler and a number of other migratory songbirds, can't withstand the predation or can't compete against the more aggressive edge species, and they die out, reducing the biodiversity of an area (Porneluzi and Faaborg 1999, Rosenberg et al. 1999, Robinson et al. 1995). DeSanto and Smith (1993) discuss the habitat fragmentation consequences specific to HSR systems. They conclude that the long-term impacts of habitat fragmentation are directly related to the area and type of habitats replaced and discuss. A European Commission Report (COST 2000) discusses the habitat fragmentation effect of railways.

The HSR DEIS/EIR does mention that the rail will fragment habitat, but the extent to which this will harm specific species is not detailed. In fact, the details of the fragmentation impact are embedded in the technical reports. Again, the environmental document itself is lacking specification, only revealing that "Segments that would be placed at grade (cut and fill) would require fencing the HST alignment for the safety of humans, as well as protection from train-wildlife collisions, and would have the potential to interfere with wildlife movement." (p. 3-15-22). Depending on the design of the fencing, this impact would be significant. In fact, in the technical documents under "Alignment Design Parameters: Grade Separation" we find that exclusion of wildlife is a goal of the fencing: "…the right of way would be fully access controlled (fenced) in areas of high-speed operation to avoid intrusion by pedestrians, *wildlife* and livestock (Engineering Criteria, Task 1.11, p. 11, emphasis added)." The impacts of this fencing is never analyzed in the DEIS/R. In order to even identify the dimensions of the planned fencing, one must know to look in Appendix 4 C (page 4C-10). This is a major example of the failure of the DEIS/R to effectively present and analyze the impact of the proposed project on biological resources.

The Missing Linkages report and associated GIS overlays identify major areas of movement throughout the state. However, identifying areas where these linkages will be cut off by the HSR route does not adequately address the significant habitat fragmentation impacts that the alignment will have. Every one of the 700 proposed miles will fragment habitat of species and have impacts on ecological functioning. A revised DEIS/EIR must be present the significant fragmentation impacts of the various alignments to wildlife species of concern, not only species that are currently threatened and endangered.

Particularly lacking in the DEIR/EIS is an analysis of impacts to wide-ranging species such as mountain lions, coyotes, bobcats, and bears. By virtue of their need to access large areas of habitat, these species would be significantly impacted even if they are not currently identified as "sensitive." Much work has been done looking at the movement needs and impacts of roads on these species (e.g. black bears – Brody and Pelton, 1989, mule deer and elk – Rost and Bailey 1979) and even their needs in terms of wildlife crossing to avoid and mitigate impacts from transportation infrastructure (e.g. Evink 1990, Leeson 1996). Specifically for mountain lions, a 9 to 12 foot fence, with a 12-48 inch foot overhang with barbed/predator or electric wire at the top to stymie a cat from

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climbing over are recommended. Florida uses a 10 foot fence with 3 barbed wires for an overhang to keep lions off highways and channel them into culvert underpasses. A noted above the HSR proposes to use security fencing that is only 8.2 ft high. The insufficient height and design could potentially lead to mountain lions on the track, obviously a threat to wildlife survival and human safety.

Habitat fragmentation can present significant problems for the normal functioning of ecological processes. For example, pollination is a major ecological process that will be impacted by the proposed HSR project. Bhattacharya et. Al (2003) found that while bumblebees have the ability to cross a road and a railroad, these structures may restrict bumblebee movement and act to fragment plant populations because of their site fidelity when foraging. The bumblebees they studies rarely crossed railroads even when suitable habitat was only 30-40 m away on the other side. This signifies that High Speed Rail may have significant and unquantifiable impacts on plant species which depend on these pollinators for their reproduction, genetic flow and ultimate survival. Additionally, the rail will fragment bumblebee (and presumably that of other insect) habitat, with the associated lower survival and reproduction. The ability of an ecosystem to survive a natural disaster (such as fire, earthquake, windstorm, disease outbreak) is decreased as habitat is fragmented. Fragmentation also limits the ability of species and ecological communities to respond and adapt to global climate change. The DEIS/R completely fails to address the impacts on all such ecological processes.

3. The DEIR/EIS fails to analyze impacts from the invasion of non-native species alongside rail alignments.

Roads spread exotic species of plants and animals, which then compete with native species. Exotic plants tend to favor disturbed habitats, so they thrive along the side of new roads. They also tend to grow and use resources very fast, depriving native vegetation of important resources. In the past, exotic species sometimes have been introduced to roadsides to control erosion, with severe ecological consequences. Along a California pipeline, exotic species invaded adjacent grassland, coastal sage, and oak woodland habitats (Zink et al. 1995). In the Mojave desert, the plant *Brassica tournefortii* has spread along roads and since 1995 has been encroaching beyond roadsides into pristine habitat. Similarly, *Hirschfeldia incana* [*Brassica geniculata*], *Descurania sophia*, *Sisymbrium irio*, *Sisymbrium altissimum*, and *Salsola* spp. are also found locally along roadsides in the Mojave (Brooks and DeFalco 1999). The ecological changes associated with these exotic plants directly degrade habitat for the threatened desert tortoise. Gelbard and Harrision (2003) found significantly more invasive species at distances closer to roads in Central Valley grassland communities. A review of literature regarding the impacts of railroads on wildlife (van der Grift 2001) indicates that trains introduce exotic plant species through the spread of seeds. The DEIS/R must discuss the potential impacts to native species posed by the resultant spread of invasive species and present appropriate mitigation.

4. The DEIR/EIS fails to adequately analyze impacts to wildlife from noise, vibration, lighting, and electromagnetic fields (EMF) and electromagnetic interference (EMI)

The construction and operation impacts of the proposed HSR will have major impacts on wildlife. The ecological impacts due to noise, vibration, lighting, electromagnetic fields (EMF) and electromagnetic interference (EMI) are not analyzed in the DEIS/R.

Noise, vibration and lighting all lead to avoidance by wildlife species and contribute to habitat fragmentation (DeSanto and Smith 1993). Many animals use sound to communicate, navigate, avoid dangers, and find food (Bowles 1997). Thus, Bowles finds that negative impacts of noise are reduced health, altered reproduction, survivorship, habitat use, distribution, abundance, or genetic composition, and harassment. For example, recordings of dune buggy sounds played intermittently for less than ten minutes at a lower intensity than normal caused hearing loss in sand lizards and kangaroo rates, rendering them unable to respond to recorded predator sounds (Andrews 1990). The impacts of sound vary by pitch, duration, loudness, and species. In general, mammals hear from below 10 hertz (Hz) to over 150,000 (Hz) (Bowles 1997, Fay 1988), birds from 100 Hz to about 10,000 Hz (Fay 1988, Kreithen and Quine 1979), reptiles between about 50 and 2000 Hz (although snakes and turtles hear quite poorly – Forman et al. 2003), and amphibians between 100 and 2000 Hz (Forman et al. 2003).

Vibrations from low-frequency noise are readily detectible by some animals, especially birds and reptiles (Bowles 1997, Shen 1983). Detection of vibration is particularly important in the detection of predators, probably especially for reptiles because of their poor hearing. The impacts of noise and vibration will depend on the frequency of train passage, the type of construction, the surrounding habitat (e.g. noise will travel further in an open field than in a forest) and the speed of the train itself. Forman et al. (2003) report that noise impacts from a Dutch highway with 50,0000 vehicles per day and a traffic speed of 120 km per hour reach beyond 800 m (approximately a half mile).

Mountain lions are known to avoid crossing areas that are lit at night (Beier 1995). This behavior is expected to be true of other nocturnal species.

Although it was not readily apparent in the DEIR/S, we were able to ascertain through communication with an engineer from the Train Riders Association of California (D. MacNamara, personal communication) that the overhead cables will be continuously electrified. A state of the art European Commission Report (COST 2000) indicates that railways cause bird mortalities through collision with trains, overhead cables, and electrocution. Winter season has the highest number of casualties with one summer study on the North TGV line reporting 3.4 dead birds per kilometer per month. This would lead to over 3800 dead birds in the summer months on the proposed HSR 700 mile length, with yearly estimates expected to be over 7500 as more birds were killed in the winter. Birds of prey were the most vulnerable. Overhead cables are dangerous mostly for low-flying birds and birds of prey that hunt by skimming the ground. This impact can be reduced when: 1) cables form dense, continuous networks (especially near stations and

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railway junctions); 2) There is vegetation along the track at least as high as the cables; and 3) when the cables are in trench tracks which are avoided by birds. In the COST study, electrocution accounted for a small percentage of the birds killed on railways. It is suggested that in order to reduce this threat, the catenary suspension wire should be insulated, a platform should be installed over the support, or the insulator should be oversized to discourage perching. We have summarized suggestions for fencing and wildlife crossings that would reduce the mortality from collisions in our comments regarding mitigation.

Finally, the DEIS/R does not discuss the potential impacts of Electromagnetic Fields (EMF) or Electromagnetic Interference (EMI) on wildlife. Possible impacts could include changes in orientation, for both short and long-distance movements, avoidance of habitat, and disturbance of daily activities, all of which are likely to be significant. These impacts must be analyzed in an updated DEIS/R.

5. The DEIR/EIS Fails to adequately analyze impacts to proposed and final federally designated critical habitat

The federal Endangered Species Act prohibits the destruction or modification of listed species' critical habitat. See 16 U.S.C. § 1536(a)(2). Section 7 of the ESA requires that federal agencies consult with the US Fish and Wildlife Service to determine if a project will "adversely modify" critical habitat. Id. Recent court rulings clearly emphasize that critical habitat is designated to provide for the survival and recovery of a species. (Center for Biological Diversity vs. Bureau of Land Management, Northern California District Court 2004; Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service, 9th Circuit 2004) Modification that decreases the likelihood of survival or the likelihood of recovery is unlawful. There are numerous species with designated and proposed critical habitat within the impact area of the HSR project. The DEIR/EIS should consider impact in even those areas in which critical habitat is only proposed as potentially significant impacts because by the time the environmental documents for this project are finalized, most of the proposed designations will have become final.

Critical habitat is comprised of land officially designated by the USFWS to contain the primary constituent elements for a listed species. This habitat cannot be "adversely modified" in any way that would impact the survival or recovery potential of the species. Clearly running a HSR track and fencing the entirety of the alignment within critical habitat would constitute adverse modification.

Here, the DEIS/R fails completely to discuss impacts to critical habitat except in the Los Angeles to San Diego via Inland Empire Biological Resources technical report. This report maps the overlap between the proposed HSR route and critical habitat for the arroyo toad, California gnatcatcher, California red-legged frog, Least Bell's vireo, Quino checkerspot butterfly, Riverside fairy shrimp, San Bernardino kangaroo rat, southwestern willow flycatcher, and vernal pools. However, the document fails to analyze the results of this map. From initial inspection, it would appear that this route would impact the critical habitat of several of these species.

In the discussion below regarding specific alignments, we have highlighted overlap between species critical habitat beyond the 0.5 m level addressed in the DEIS/R. Forman and Alexander (1998) and Forman et al. (2003) clearly indicate that the road effect zone can be well beyond 1000m. Of additional concern are overlaps with critical habitat of vernal pool species (11 plants and 4 invertebrates), California tiger salamander, California red-legged frog, and Alameda whipsnake (currently remanded). We did not investigate -- but the next DEIS/S must investigate -- the overlap between critical habitat of the Valley elderberry longhorn beetle, Central California coast coho salmon, Central Valley steelhead, Central California coast steelhead, southern steelhead, Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley fall/ late fall-run Chinook salmon, delta smelt, and tidewater goby.

6. The DEIR/EIS fails to assess consistency with federal threatened and endangered recovery plan goals

The federal ESA also requires the development of a recovery plan for species that are listed as threatened or endangered. The purpose of the ESA is to provide for the ultimate recovery of at-risk species, thus the goal of every recovery plan is to reach a level of conservation to ensure survival of the species and thus allow it to be removed from the ESA list. Recovery plan are often state of the science documents that have been developed by the experts of the relevant species. These plans are excellent road maps, including the identification of core recovery units that provide the necessary context within which to analyze the impacts of particular projects on a listed species. As such, these plans should be consulted and the DEIS/R must analyze consistency of the proposed project with these plans and the ultimate choice of alignment must not conflict with these plans. Currently there are recovery plans in place for the San Joaquin kit fox, desert tortoise, Bay checkerspot butterfly, delta smelt, California red-legged frog, blunt-nosed leopard lizard, California condor, marbled murrelet, giant kangaroo rat, Fresno kangaroo rat, short-nosed kangaroo rat, Tipton kangaroo rat, San Joaquin Valley riparian woodrat, arroyo toad, Pacific pocket mouse, Riverside fairy shrimp, and San Diego fairy shrimp. Recovery plans are being developed for 15 vernal pool species, the giant garter snake, Alameda whipsnake, and western snowy plover and these should be incorporated into the DEIS/R analysis if they have become available by the time of the next draft. To the extent possible, input should be solicited from the US Fish and Wildlife Service to receive any draft recovery goals or input for these species.

7. Scientific literature not noted

A vast amount of literature exists about the impact of roads on ecological systems, much of which is equally applicable to high speed rail. Notable summaries are covered in Forman et al. 2003, NRDC 1999, Evink 2002, and White and Ernst 2003. We request that an in-depth literature review be conducted on the impacts of high-speed rail on biological resources and be presented as part of an updated DEIS/R. We specifically request that Rodriguez et al. (1997), Andrews (1990), Yanes et al. (1995), DeSanto and Smith (1993) be included in this review.

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8. The DEIR/EIS fails to adequately asses impacts to conservation lands and planning areas

The proposed project traverses several areas that are currently ecological reserves, or are part of regional conservation planning efforts. While the DEIS/EIR mentions some of these, a more complete analyses of all such impacts is required. Included amongst these are state parks, state ecological reserves managed by the California Department of Fish and Game, University of California preserves, National Forests, Griffith Park in Los Angeles, the Pixley National Wildlife Refuge in Tulare County, Don Edwards San Francisco Bay national Wildlife Refuge, the San Luis National Wildlife Refuge, the Grasslands Ecological Area of northern San Joaquin Valley, Henry Coe State Park, as well as several U.S. Department of Defense lands and Bureau of Land Management lands. Regional conservation planning efforts potentially impacted by the HSR project include the San Bruno Mountain HCP, Santa Clara County HCP, San Benito County HCP, South Sacramento County HCP, San Joaquin County HCP, Eastern Merced County HCP/NCCP, Kern Valley Floor HCP, Western Mojave Desert Coordinated Management HCP, West Riverside NCCP, Coachella Valley MSHCP, Orange County Central NCCP Coastal NCCP, Southern Orange County NCCP and the San Diego County Multiple Habitat Conservation Plan. Even those regional conservation plans that are currently in scoping or planning phases must be considered and discussed as impacts from HSR could significantly change their reserve design capabilities. Regional conservation plans and County General plans are both designed to direct development into certain regions based on stated priorities. The addition of HSR service and associated stations will have an enormous impact on growth of this development. The impact of the HSR alignment options must be analyzed for consistency with regional conservation plans and County General Plans. The DEIS/EIR must discuss the impact of the proposed project on all ecological reserves and regional conservation planning efforts.

9. The DEIR/EIS fails to assess economic costs of wildlife impacts

In France, there are 16,500 km of railway lines: 1500 km of TGV lines (existing and under construction) and 15,000 km of main lines (in service and electrified: electrification is used as a criterion of heavy traffic). The cost of direct collisions with wildlife is considerable. In 1992, on the high speed South East line (Paris-Lyon) 21 collisions incurred an expense of 1.26 million Francs (192,000 euros), due to delays and equipment repair costs (COST 2000).

10. The DEIR/EIS fails to adequately analyze the disruption of wildlife movement corridors

While the DEIS/R analysis identifies alignments that have impacts on the wildlife corridors identified in the Missing Linkages Report, it lacks adequate analysis regarding which species are affected. Additionally, there is no analysis of the level of the impact on these species in terms of the significance of the disruption of their movement corridors on their ability to survive. For instance, a fence that was erected to keep foot and mouth disease from spreading into South Africa caused the death of hundreds of thousands of wildebeest because it prevented them from moving north (Andrews 1990). Impacts that must be discussed include entanglement in fences, restriction of access to needed water supplies, prevention of movement into good habitat, disruption of seasonal movement, limited dispersal which causes local overpopulations, and inbreeding due to genetic isolation. These impacts go well beyond the 1000 ft. to 0.5 mile zone considered in the DEIS/R (Forman and Deblinger 2000). Below in our alignment specific analysis we have identified the species whose movement corridors will be impacted by the HSR proposed project. A revised DEIS/R must include identification of the species, the specific corridors that would be disrupted, and what this disruption means for the species' conservation. For example, it should be noted that Santa Nella is a major choke point for north-south movement of the San Joaquin kit fox. Disruption of this movement corridor would significantly impact the ability of that species to survive and recover.

11. The DEIR/EIS fails to include an adequate analysis of impacts to vernal pools/ wetlands

The analysis of the vernal pool and wetlands impacts is based on overlap of the alignments with the National Wetlands Inventory. This inventory is incomplete in California and, similar to the reliance on the CNDDB for species occurrences, is biased towards areas that have been surveyed opportunistically. A complete analysis of wetlands impacts requires on-the-ground surveys to document presence. Additionally, wetlands are impacted far beyond the project footprint, with any changes in watershed hydrology potentially altering wetland functions anywhere within that watershed. For vernal pools, initial proposed critical habitat (67 FR 59883 59932; September 24, 2002) should be used to determine impacts to the 15 listed vernal pool species critical habitat. The final vernal pool critical habitat is currently under litigation due to the exclusion of nearly 1 million acres based on faulty calculations by the US Fish and Wildlife Service. Until an acceptable new designation is released, the original proposal must be used to assess the impacts. In the following analysis of impacts, we have used the GIS coverages for this proposed critical habitat designation to determine overlap with the proposed alignments and the potential impacts from this overlap.

12. The DEIR/EIS fails to adequately analyze impacts of loss of habitat

As state previously, the DEIS/R does not adequately analyze the impact of habitat loss on the ability of specific species or plant community types to survive and recover. Noticeably absent is an analysis of the relative quality and importance of any lost habitat. There is simply an accounting of how much habitat falls within a relatively narrow zone. Also, the impact zone must be much larger than the 1000ft. to .5 mile range used in the DEIR/EIS. Forman et al. (2003) indicate that several biological effects of roads (including stream sediment, noise, vibration and light, habitat fragmentation/isolation, disruption of wildlife movement corridors, invasion by non-native species, and increased human access) go well beyond 1000 m.

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C. Species and habitat concerns that appear in several alignments

1. Impacts to Grasslands

Central Valley grasslands are a highly threatened ecosystem, with over 95% of the native habitat overrun with invasive, annual grasses. The remainder is under imminent threat from urban and suburban development and changing agricultural practices. Special statues birds (including federally and state listed threatened and endangered or special concern) number seventeen and include: Swainson's hawk, California burrowing owl, loggerhead shrike, horned lark, grasshopper sparrow, northern harrier, white-tailed kite, white-faced ibis, tri-colored blackbird, sandhill crane, ferruginous hawk, prairie falcon, short-eared owl, golden eagle, mountain plover, long-billed curlew, and Merlin. Additionally, Central Valley grasslands attract the highest density and diversity of wintering raptors anywhere in the world. This habitat also supports several endemic or near-endemic species or subspecies of reptile and amphibians including the San Joaquin whipsnake, the blunt-nosed leopard lizard, Gilbert's skink, and the giant garter snake. The Delta green ground beetle and Valley elderberry longhorn beetle are federally listed insects that occur in grassland habitats. Grasslands historically supported several large mammals including pronghorn antelope, elk, (including Tule Elk), mule deer, grizzly bear, gray wolf, coyote, mountain lion, ringtail, bobcat, and San Joaquin kit fox, many of which still roam the less developed remnants.

The DEIS/R mentions potential impacts to grassland habitats, but does not adequately analyze the impacts in terms of quality of habitat that will be impacted and how this effects the ability of species to survive as well as use this habitat as part of the Pacific Flyway. Of particular concern is the Grasslands Ecological Area of the northern San Joaquin Valley. This is a 160,000-acre area in Merced County located between the towns of Dos Palos, Los Banos, Gustine and Merced. The Grasslands includes seasonally flooded wetlands, semi-permanent marsh, woody riparian habitat, wet meadows, vernal pools, native uplands, grasslands, and native brush land. This collection of diverse habitats is important for a wide variety of wetland species and hundreds of thousands of shorebirds migrate through the area. It has been recognized by the Western Hemisphere Shorebird Reserve Networks one of fifteen internationally significant shorebird habitats, by the American Bird Conservancy as a Globally Important Bird Area, and is currently nominated as a Wetland of International Importance under the Ramsar Convention. All three of the prestigious titles recognize the importance of the grasslands to a variety of wildlife, including several rare and endangered species, its critical role as wintering habitat for Pacific Flyway waterfowl, and its status as the largest remaining block of wetlands in what was once a vast Central Valley ecosystem. Although Grasslands provides wintering habitat for twenty percent of the Pacific Flyway waterfowl populations, encompasses one of the largest remaining vernal pool complexes, and supports several federally listed or proposed threatened and endangered species including the San Joaquin kit fox, Aleutian Canada goose, Swainson's hawk, and tri-colored blackbird, this area is not even mentioned in the DEIR/S.

In addition, the growth-inducing impacts of stations in Los Banos, Merced, and Gilroy will be enormous for the Grasslands Ecological Area and must be analyzed. We predict that these impacts will be too significant to mitigate. As a result, we recommend no stations be built in these locations. The final alignment may need to avoid this area altogether due to the ecological impacts. Ultimately the goal of the HSR project should be to connect the larger metropolitan centers in the state, not to create more in ecologically sensitive areas.

2. California Burrowing Owl

The California burrowing owl is a California state species of special concern. This species is known to occur (CNDDB) throughout the entire alignment of the HSR proposal. Records indicate that California burrowing owls have been found within 1800 ft of the following proposed alignments: Sacramento to Stockton (Alignments UP1, UP2, BNC1, BN1, UP5, UP6, BNC2), San Jose to Oakland (west and east alignments), San Jose to Merced (Southern route alignments), Tulare to Bakersfield, LA to Bakersfield (1-5 and UPRR alignments), LA to March ARB (UP/ Colton 1, UP/Riverside line, UP/Colton 2, and UP /Colton 3 alignments), LA to Anaheim, Union Station to LAX, March ARB to Miramar, Oceanside to San Diego, and Miramar to San Diego. Considering the incomplete database that this cursory analysis is based on, it is apparent that the entire alignment must be surveyed for burrowing owls and the potential impacts analyzed.

An example of how lacking the DEIR/EIS analysis is with respect to burrowing owl, the Sacramento to Bakersfield technical evaluation does not even mention impacts to this species, despite the fact that burrowing owls exist in this area. While the Bay Area to Merced technical evaluation does calculate an overlap between the HSR proposal and California burrowing owl occurrences, again no detailed analysis of the quality of this habitat and its importance to the species is presented. Nor is a description of the species biology and behavior presented. This is but one detailed example of the DEIS/R's inadequate analysis of the impacts to species of special concern.

Of particular concern is that burrowing owl often prefers to nest near roads and artificially raised areas (such as berms and levees). Clearly, nesting near the HSR alignments could pose a problem in terms of survival including collision mortality, increased predation risk, and decreased habitat connectivity. We expect a revised DEIS/R to include information an all impacted species such as the following example for burrowing owl:

- Species description
- Distribution
- Seasonal activity
- Substrate Affinities and Burrow use (or equivalent special habitat needs)
- Home range
- Reproduction
- Dispersal
- Habitat characteristics

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- Population status
- Threats
- Conservation status
- Impact of proposed project
- Mitigation
- Justification that mitigation reduces the impacts to a non-significant level

3. Western Mojave Omissions – Desert tortoise

Conspicuously absent from the discussion of impacts to biological resources in the eastern Bakersfield to LA Alignment is any discussion of the impact to the Western Mojave Desert HCP planning effort. This HCP is in the final stages of approval and should be released in the fall of 2004. Most egregiously, the desert tortoise is not listed among the imperiled species that would be impacted by the proposed HSR project. The Mojave Desert population of the desert tortoise has been listed as threatened since 1990 and is at risk due to a combination of several threats which include transportation infrastructure. Clearly, the omission of any discussion of this high profile federally and state threatened species indicates that the DEIS/R is vastly inadequate. The HSR proposes to traverse the Alkali mariposa lily Conservation Area and Bat Conservation Area (for Townsend's big-eared bat, long-legged myotis, California leaf-nosed bat, pallid bat, and Western mastiff bat). The proposed alignment would cross the largest roost known for all six target species – the roost under the Interstate 15 bridge at the Mojave River crossing contains over 10,000 bats. The proposed station in Palmdale would only exacerbate conservation problems and the declining status of species such as the Mohave ground squirrel and the desert tortoise.

Located in an ecotone between the Sierra Nevada range, the Central Valley, and the Mojave Desert, the Tehachapi area is extremely important ecologically. Many species converge here and the impacts of a proposed HSR system here are likely too enormous to allow sufficient mitigation. This is an important area for the recovery of California Condors, an icon for the Endangered Species Act. The eastern alignment through Tehachapi from Merced to LA additionally fails to discuss the impacts on the pronghorn antelope. Habitat fragmentation throughout the West has had a demonstrated negative impact on migratory behavior of pronghorn (Buechner 1950, O'Gara and Yoakum 1992; van Riper and Ockenfels 1998). Van Ripper et al. (2001) found that a fenced railroad right-of-way in Arizona isolated pronghorn into discrete populations. White (1969) reported that fenced highways blocked the movement of pronghorn and resulted in as much as 80% herd mortality. The pronghorn population traversed by the Tehachapi alignment is one of the only known remaining pronghorn herds in the state, and as a wide-ranging species, this population is clearly vulnerable to impacts from the proposed HSR and these impacts must be described and addressed.

D. Impacts to specific areas by specific alignments

For all the species and habitat impacts, the furthest impacts reported in the DEIS/R are within 0.5 miles of each alignment. This spatial area of analysis is insufficient for all impacts, especially fragmentation and wildlife movement corridor impacts. A biologically defensible impact zone must be determined and analyzed in an improved DEIS/R. In our GIS analysis, we buffered the proposed HSR alignments by 1800 meters on each side, as Forman et al. (2003) indicate that several biological effects of roads (including stream sediment, noise, vibration and light, habitat fragmentation/isolation, disruption of wildlife movement corridors, invasion by non-native species, and increased human access) go well beyond 1000 m.

For the discussion below, we organized our comments to first reflect general issues of concern for each alignment followed by citations to specific wildlife corridors impacted by specific alignments and why each of these corridors is biologically important. The wildlife corridors noted are found in the California Wilderness Coalitions' "Missing Linkages" report. The impacts to these corridors come from the placement of the alignments into these corridors or crossing these corridors. As noted, the alignments will disrupt these areas from construction impacts as well as operational impacts, particularly where the alignment is constructed at grade with fencing. Finally, we also provide an analysis of specific areas of federally designated critical habitat impacted by specific alignments. All of these issues raised reflect issues that were either inadequately discussed in the DEIR/EIS or not discussed at all.

1. Bay Area to Merced Route:

The following comments are in addition to the detailed comments presented by the Loma Prieta Chapter of the Sierra Club:

San Joaquin Kit Fox (SJKF)

The Bay Area to Merced Biological Resources Technical Evaluation acknowledges that SJKF habitat will be impacted, but does not include essential elements of its biology, especially pertaining to movement needs, which make it particularly susceptible to negative impacts from the proposed high speed rail project. Without knowing the characteristics of this impact, it is difficult to impossible to plan to avoid and mitigate them. The revised document must include information such as the dispersal requirements and discuss wildlife crossing structures and how they can best be designed for this species. In particular, we request that information from previous crossings developed in consultation with the US Fish and Wildlife Service and the San Joaquin Kit Fox Planning and Conservation Team be consulted. HSR alignments in San Joaquin kit fox habitat should be equipped with directional fencing, frequent underpasses, and escape dens to prevent high levels of predation by coyotes.

All north and south alignments from Merced to San Jose cross through areas within Stanislaus and or/ Merced Counties that are identified as high priority recovery efforts by the US Fish and Wildlife Service Recovery Plan for the San Joaquin Kit Fox. These proposals will directly impact between 2019 and 3122 acres of this species habitat and

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fence off a major wildlife corridor for this species. The resultant habitat loss and fragmentation can cause decreases in fox abundance through changes in social ecology, productivity, spatial use, dispersal, and survival (Bjurlin 2003). San Joaquin kit foxes may range up to 20 miles at night during the breeding season (Girard 2001) and up to 6 miles during the pup-rearing season. Because they move at night, any lights associated with the high-speed rail project will have a negative impact on the ability to survive in the vicinity.

a. SJ to Bay Area Route

i. SJ to SF Alignment

Wildlife movement corridors impacted:
- BA 107: This corridor contains riparian areas as well as bay wetlands. It also provides a linkage for waterfowl, shorebirds, and the harvest mouse.

ii. SJ to Oakland Alignment

Critical habitat impacted:
- California tiger salamander critical habitat is impacted by the west route, Union City to SJ via coastline alignment.
- Vernal pool species critical habitat is impacted by the west route, Union City to SJ via coastline alignment.

Wildlife movement corridors impacted:
- BA 103: This corridor includes the Alameda Creek Watershed, which is a key linkage and choke point for steelhead, western pond turtle, CA red-legged frog and foothill yellow-legged frog.

-BA 104: This corridor contains Coyote Creek, which is a linkage and choke-point for salmon.

-BA 107: The HSR alignment crosses this corridor twice on the west route. This corridor contains riparian areas and bay wetlands which serve as linkages and stepping stones for waterfowl, shorebirds, and the harvest mouse.

b. SJ to Merced Alignment:

Critical habitat impacted:
- California tiger salamander
- Vernal pool species (South lines alignment)
-

Wildlife movement corridors impacted:
-BA 104: This corridor contains Coyote Creek, which is a linkage and choke-point for salmon.

i. North Lines – The Diablo Alignment

Wildlife movement corridors impacted:

-CV 8: This corridor is important for San Joaquin kit fox, giant kangaroo rat, blunt-nosed leopard lizard, short-nosed kangaroo rat, and LeConte's thrasher.
-CV 19: This corridor is important for Riparian brush rabbit, wood rat, W. yellow-billed cuckoo, neotropical migrants, ringtail (riparian habitat major). There is a need to maintain riparian species refugia above flood levels as part of the Recovery Plan for Upland Species of the San Joaquin Valley, USFWS 1998.
-BA 103: This corridor contains the Alameda Creek Watershed, which is a linkage and choke point for steelhead, western pond turtle, CA red-legged frog and foothill yellow-legged frog. This corridor is impacted by the North Tunnel Alignment Option.
-BA 104: This corridor contains Coyote Creek, which is a linkage and choke-point for salmon (Minimize Tunnel Option and Tunnel under Henry Coe Option).

ii. South Lines – Pacheco Alignment:

-BA 10: This is the Santa Cruz Mountain – Mt. Hamilton Mountain corridor which is a choke point for mountain lion, bobcat, and coyote.
-CC 19: This corridor is a population recovery "stepping stone" and/or "migratory stopover" habitat for neotropical migratory bird species. It also provides connectivity for steelhead with headwaters spawning and rearing habitats, as well as a movement linkage for large and small mammals. Least bell's vireo was recorded here in 1997. This corridor is crossed a second time on Gilroy Bypass Option.
-CC 22: This is an important corridor for medium/ large-sized carnivores, including mountain lion.
-CV 18 (two different corridors with similar impacts): The species impacted by the disruption of this corridor include San Joaquin kit fox, blunt-nosed leopard lizard, kangaroo rat. The important habitats in this corridor include Grassland, Alkali scrub, Alkali sink scrub, and marshland. This area is noted as important to the San Joaquin Recovery Plan.

2. Sacramento to Bakersfield

a. Sacramento to Stockton Corridor

Critical Habitat impacted:
-Significant impact to vernal pool species critical habitat from the BN4 Alignment.

Wildlife movement corridors impacted:
-CV 25: This is a riparian corridor important to birds and Tule Elk. It provides an important linkage to the Sierra Nevada ecoregion.

b. Stockton to Modesto Corridor

Wildlife movement corridors impacted:

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-CV 19 (two different corridors with same function): Riparian brush rabbit, wood rat, western yellow-billed cuckoo, neotropical migrants, and ringtail are species found in this area.

c. Modesto to Merced Corridor

Critical Habitat impacted:

- Significant impacts to vernal pool species from BNC3 alignment.

Wildlife movement corridors impacted:

-CV 19: This corridor is important for riparian brush rabbit, wood rat, western yellow-billed cuckoo, neotropical migrants, and ringtail.
-CV 18: This corridor is used by San Joaquin kit fox, blunt-nosed leopard lizard, and kangaroo rat.

d. Merced to Fresno Route:

Within the Fresno River and San Joaquin River areas, major issues of concern are impacts to vernal pools and riparian habitat. Public or protected lands in this section include the San Joaquin Valley Ecological Reserve. Construction and operational impacts would likely affect water quality, riparian habitat, and aquatic habitat. Part of the fall-run Chinook salmon Evolutionary Significant Unit is downstream of the San Joaquin River crossing.

Critical Habitat impacted:

- There will be significant impacts to vernal pool species from the UP13, BN15, and BN14 alignments.

Wildlife movement corridors impacted:

-CV 18: This is the Madera-Merced Linkage, which is important to SJKF, blunt-nosed leopard lizard, and kangaroo rat (crosses subsection UP13).

e. Fresno to Tulare Route:

Numerous biodiversity elements are associated with this area, including vernal pools, riparian corridors, and sensitive species. Linkages through this section are riparian linkages and any change in riparian cover or vegetation would be considered a significant impact.

Critical habitat impacted:

- California tiger salamander critical habitat will be impacted from this route.

Wildlife movement corridors impacted:

- CV 12: This is the Kings River corridor which serves as a choke-point for neotropical migratory birds and the Fresno kangaroo rat. This corridor is crossed by subsection UP18 and subsection BN20.
- CV 14: This is the St Johns River corridor which is important for kangaroo rat, SJKF, and neotropical migratory birds. This alignment crosses the corridor at subsection UP18).

f. Tulare to Bakersfield Route:

Major issues of concern in this section include impacts to riparian habitat, linkages, vernal pools, wetlands, and threatened and endangered species. Allensworth Ecological Reserve and Pixley National Wildlife Refuge provide habitat for numerous threatened and endangered species, such as San Joaquin kit fox and vernal pool fairy shrimp. Deer Creek linkage is a riparian linkage that would be impaired by changes in vegetation composition and structure. Poso Creek drains into the Kern National Wildlife Refuge and other wetlands, which may be affected by changes in water quality and surface and groundwater flow due to project construction and operation.

Proposed alignments on existing tracks through this area will limit construction to upgrading of the tracks; however, noise impacts and changes to local habitat due to the speed of the trains will likely occur.

Critical Habitat impacted:

- There will be impacts to vernal pool species from the BN22 alignment.

Wildlife movement corridors impacted: [CYNTHIA – CAN YOU PUT THIS AND THE REST OF THE CORRIDOR SECTIONS REMAINING IN THE COMMENTS INTO SENTENCE FORM]

- CV 5: Highway 43/ Garces Highway is a barrier that fragments habitat for the San Joaquin kit fox, blunt-nosed leopard lizard, Tipton kangaroo rat (crosses subsection BN22 twice).
- CV 6: This is the Deer Creek/ Sand Ridge corridor that is a missing linkage and choke-point for many T&E species, Tulare lake marsh colonial birds as well as neotropical migratory birds. The alignment crosses this corridor at subsection BN22 and subsection UP21.
- CV 10: This as the Tule River corridor that is a landscape linkage and choke-point for pond turtles, neotropical migratory birds, and rare plants. The alignment crosses this corridor at subsection UP21.
- CV 4: This is the Pozo Creek corridor that is a missing linkage for the San Joaquin kit fox. The alignment crosses this corridor subsection BN22 and at subsection UP22.
- CV 1: This is the Kern River corridor that is a choke-point for the San Joaquin kit fox, Tipton kangaroo rat, and Buena Vista lake shrew . The alignment crosses this corridor as subsection UP25 and subsection BN25.

3. Bakersfield to LA Route: